MSF1000

MSF Radio Time Code Receiver

User Manual

Version 1.2

worldtime SOLUTIONS

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LIMITED WARRANTY

The MSF1000 MSF Radio Time Code Receiver is guaranteed against failure due to faulty parts or workmanship for a period of five (5) years from date of purchase.

In the event of product failure due to faulty parts or workmanship within the warranty period, World Time Solutions Limited, at its own discretion, will either (a) repair the product, (b) supply a replacement product, (c) supply a functionally equivalent replacement product, or (d) refund the purchase price of the product.

The limited warranty will not apply if (a) the product has not been installed or operated as per our instructions, (b) the product has been modified in anyway.

In the event of failure, the MSF1000 should be returned to the manufacturer for inspection and repair. Please visit our support pages for further details:

`www.worldtimesolutions.com/support.html`

TECHNICAL SUPPORT

To obtain help with the installation or operation of the MSF1000, please visit our web site at:

`www.worldtimesolutions.com/support.html`

1 - Introduction

The MSF1000 is an economical radio time code receiver system designed to synchronise to the MSF radio transmission broadcast from Cumbria in the UK. Once synchronised, the receiver provides time and date information to an MC Series master clock via a cable connection.

The wide sensitivity range of the MSF1000 allows reliable signal decoding towards the limits of the broadcast range. Please refer to section 2 for installation recommendations and section 3 for details of confirming system operation.

1.1 - Package contents

The MSF1000 is supplied with the following component parts:

- MSF1000 60 kHz MSF Radio Time Code Receiver
- Cable for connection to a World Time Solutions MC Series master clock *(Please note: The length of cable supplied is dependent on the model ordered. See appendix A for details)*
- 5 way socket block connector for connection to an MC Series master clock
- A4 user manual

1.2 - MSF1000 front view

The drawing below shows the front view of the MSF1000.

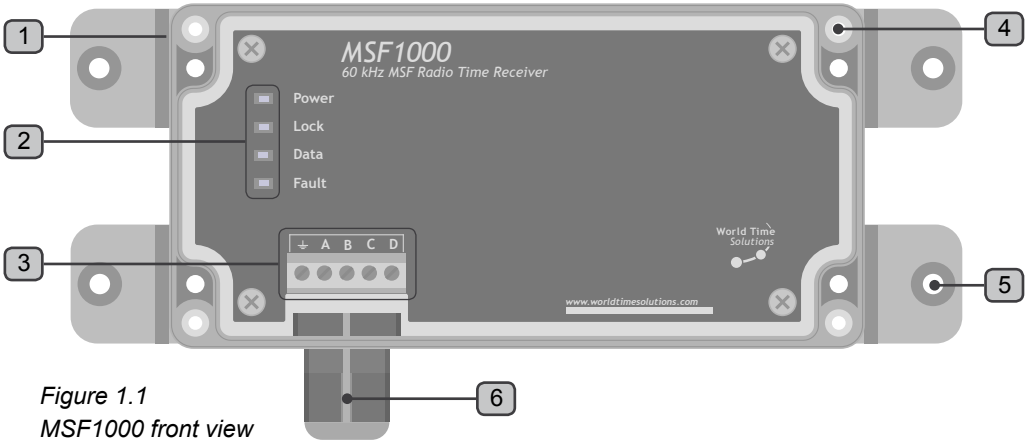

Figure 1.1
MSF1000 front view

No.	Function	No.	Function
1	IP66 (NMEA 4X) polycarbonate enclosure with clear cover	4	Cover fixings (x4)
2	Status LEDs	5	Case fixing points (x4)
3	Cable connection point	6	Cable entry grommet

Table 1.1 - MSF1000 functions

2 - Installing the MSF1000

The MSF1000 should be installed in a suitable location following the recommendations in section 2.1 below. The system should be fixed in place and then connected to the MC Series master clock using the supplied cable. If required, the cable may be extended by following the recommendations in section 2.3.

2.1 - Recommended installation locations

To achieve the most reliable operation the MSF1000 should be installed in the following optimum location:

- On the outside of a building, away from any metallic objects or electrically noisy equipment. The antenna should be positioned on the side of the building closest to the transmitter. In addition, the front (clear) face of the antenna should be facing towards the transmitter. *(The transmitter is located in Anthorn in Cumbria, United Kingdom)*.

If external installation is not practical, depending on the signal strength and the level of radio interference, it may be acceptable to install the antenna in the following location:

- Mounted internally, away from any metallic objects or electrically noisy equipment. The front (clear) face of the antenna should be facing towards the transmitter. *(The transmitter is located in Anthorn in Cumbria, United Kingdom)*.

WARNING: THE MSF1000 SHOULD NOT BE INSTALLED IN A LOCATION SUSCEPTIBLE TO A DIRECT LIGHTNING STRIKE.

2.2 - Physical installation

IT IS RECOMMENDED THAT THE ANTENNA SHOULD NOT BE PERMANENTLY FIXED IN POSITION BEFORE SIGNAL RECEPTION HAS BEEN CONFIRMED.

The MSF1000 should be secured in position using the four 4.5mm (0.178”) case fixing points *(see the drawing in section 1.2)*. Care should be taken to ensure the fixings used (not supplied) are suitable for the application.

2.3 - Connecting the MSF1000 to the master clock

The MSF1000 is supplied with a length of four core cable for connection to an MC Series master clock. The cable should connect the MSF1000 cable fixing point to a Remote Synchronisation Input on the master clock. Please refer to the drawing on the following page and table 2.1 for details of cable connections.

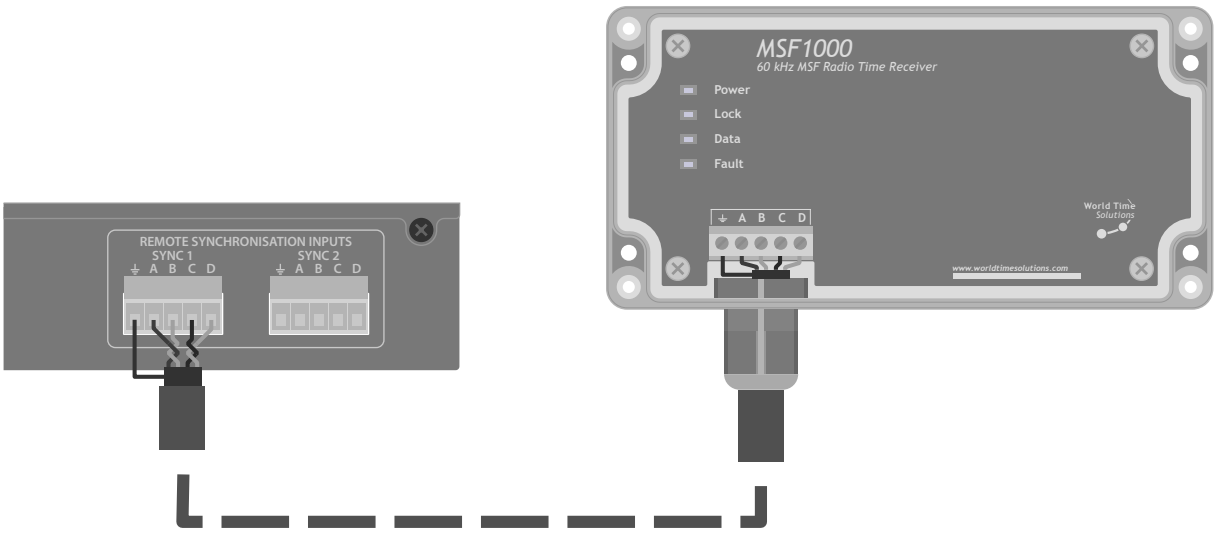

Figure 2.1 - MSF1000 master clock connection

Terminal ID	Cable colour code
GND	Cable screen drain wire
A	Black / Red
B	Red
C	Black / White
D	White

Table 2.1 - Cable connection detail

If required, the cable may be extended using Belden 9502 type cable up to a maximum total length of 150m (500ft). For low smoke/plenum applications, the supplied cable should be substituted for a Belden 82502 (or equivalent) type cable.

3 - System operation

Following installation *(see section 2)* and upon powering the MC Series master clock, the MSF1000 will automatically attempt to synchronise to the MSF radio signal. The MSF1000 also begins to send setup information to the master clock.

Depending on signal strength and the level of radio interference, system lock may take up to 30 minutes. Once the MSF1000 has synchronised to the MSF radio transmission, time and date information is automatically sent to the master clock.

3.1 - MSF1000 status information

The operational status of the MSF1000 may be visually confirmed via the status LEDs *(see figure 1.1)*. The table below lists the function of the different LEDs.

LED	Status
Power	Green LED illuminates continuously when power is applied to the MSF1000 and the system is running
Lock	Green LED illuminates continuously when the MSF1000 is synchronised to the MSF transmission
Data	Green LED flashes to indicate MSF data being received
Fault	Red LED illuminates if no radio data is detected for a prolonged period

Table 3.1 - Status LEDs

The synchronisation status may also be confirmed via the MC Series master clock. Please refer to the user manual supplied with the master clock for further details.

3.2 - Improving signal reception

The radio detection circuit in the MSF1000 radio time code receiver is highly directional in its ability to decode the MSF signals. To enable the best reception of the MSF signal, the installer should ensure that the decoder circuit is properly aligned with the MSF transmitter (located in Anthorn in Cumbria, UK).

Alignment may be confirmed by slowly rotating the MSF1000 and observing the operation of the ‘Data’ LED. When correctly aligned, the ‘Data’ LED should flash once per second.

3.3 - MSF signal outages

The MSF signal is occasionally taken off-air for maintenance work. During these periods, the MSF1000 will not synchronise and the fault LED may illuminate. The current status of the signal is available as a recorded message from the UK National Physical Laboratory:

Tel: +44 20 8943 6493

A - Specifications

Typical Performance Specifications:	
PPS accuracy:	40 msec

I/O Connections:	
I/O connection:	Single 1000 Series communication port for connection to a MC Series master clock

Mechanical & Electrical Specifications:	
Dimensions:	202 x 80 x 55 mm (7.95” x 3.15” x 2.17”) (including removable wall brackets, excluding cable grommet)
Weight:	0.5 kg (excluding cable)
Enclosure:	IP66 / NEMA 4X rated, UV stabilised polycarbonate enclosure. Light grey body and clear cover.
Cable:	Two pair plus drain 7x32 (24 AWG) stranded cable with 100% foil shield and semi-rigid, sunlight resistant, Polyvinyl Chloride (PVC) jacket.
Cable length supplied:	MSF1000-05: 5m (15ft) MSF1000-15: 15m (50ft) MSF1000-50: 50m (150ft)

Environmental Specifications:	
Operating temperature:	-20 to +50 ºC
Relative humidity:	0% - 95%, noncondensing

Standards Compliance:	
Electrical Safety:	BS EN 60950-1:2006
Radio Disturbance:	BS EN 55022:2006
Immunity Characteristics:	BS EN 55024:2003

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